# *Chemical reactions* **Student investigation sheet**

## Aims

1. To predict the products formed and to write both word and balanced chemical equations for these reactions.
2. To observe different types of chemical reactions.
3. To classify each reaction according to its general type (e.g. synthesis, decomposition, etc.)

## Equipment

Read the method below and list all items of equipment required.

## Safety

* Follow lab safety rules and the instructions from your teacher.
* Ensure that you are wearing your safety glasses at all times.
* Identify all hazards and assess the risks for all activities.
* Avoid skin contact with all chemicals used and produced.
* Report any breakages or spills to your teacher.
* Wash your hands before leaving the laboratory.

## Predictions

The chemical formulas of the compound reactants are given in the method below. BEFORE performing each reaction, predict the products based on knowledge of the different reaction types. (There may be more than one reaction of each type.)

## Method

### Reaction 1

Fluff up a piece of steel wool (mainly iron Fe), hold it with tongs over a lit Bunsen burner until it ignites. Lower the burnt steel wool onto a heatproof tile and allow it to cool completely before examination.

### Reaction 2

Mix 1 mL of 0.1 M calcium chloride (CaCl2) solution with 1 mL of 0.1 M sodium phosphate (Na3PO4) solution in a test tube.

### Reaction 3

Add a 1/4 spatula of the catalyst manganese dioxide (MnO2) to a 2 mL 3% hydrogen peroxide (H2O2) solutionin a test tube. Insert a glowing taper into the test tube to test for any gas produced.

### Reaction 4

Add a 1/4 spatula of zinc granules (Zn) to a test tube. Pour in 2 mL of 1 M sulfuric acid (H2SO4). Collect the gas produced using a safe method. Use a lit taper to test this gas.

Reaction 5 This will be demonstrated by your teacher in a fume cupboard

Add a 1/4 spatula of zinc granules to a crucible. Add 1/4 spatula of sulfur powder to the crucible and mix together. Place the crucible in a pipe clay triangle, which is resting on a tripod. Place in a fume hood over a Bunsen burner and heat the crucible strongly. Stop heating once the reaction begins.

### Reaction 6

Place a piece of aluminium foil into a small beaker containing 10 mL of 0.5 M copper (II) chloride (CuCl2) solution. Gently stir with a stirring rod as the chemicals react.

## Results and discussion

Draw correctly labelled scientific diagrams for each reaction and record observations and an explanation for what happened in each case. A word equation should be written for each reaction followed by a balanced chemical equation. Determine the reaction type in each case.

## Conclusions

Summarise the findings from the experiment and consider including additional comments on:

* how different reactions produce different products;
* any difficulties that were encountered;
* how any gases were identified;
* why balanced equations are important.